

# **HINGE**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a hinge, and more particularly to a hinge which can be rotated clockwise and counterclockwise, and positioned at some specific angles.

### **2. Description of Related Art**

Some mobile phones have a monitor mounted on a body by a hinge between the body and the monitor. The conventional hinge installed in the mobile phones has a rotary axis perpendicular to the monitor and the body. When the body is overlapped with the monitor, the mobile phone is in a status of being switched-off or hung-up; when the monitor is rotated transversally to reveal the body, a user can operate the keys on the body to receive or dial up a call.

However, by using the conventional hinge, the monitor only can be positioned at an overlapped position (an included angle of 0 degrees) and an opposed position (an included angle of 180 degrees) about the body. Thus, the monitor rotates too freely about the body in use, and the user cannot use the mobile phone in positions of the monitor about the body other than the two limits.

Therefore, the invention provides a hinge to mitigate or obviate the aforementioned problems.

## **SUMMARY OF THE INVENTION**

The main objective of the present invention is to provide a hinge which can be rotated clockwise and counterclockwise and positioned at some specific

1 angles.

2 Other objectives, advantages and novel features of the invention will  
3 become more apparent from the following detailed description when taken in  
4 conjunction with the accompanying drawings.

#### 5 BRIEF DESCRIPTION OF THE DRAWINGS

6 Fig. 1 is a perspective view of a hinge in accordance with the invention;

7 Fig. 2 is an exploded perspective view of the hinge in Fig. 1;

8 Fig. 3 is a front view of the hinge in Fig. 1;

9 Figs 4A-C are schematic views of the hinge being rotated  
10 counterclockwise; and

11 Figs 5A-C are schematic views of the hinge being rotated clockwise.

#### 12 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

13 With reference to Figs 1-3, a hinge in accordance with the present  
14 invention is composed of a first sheet (10), a rotating ring (20), a second sheet  
15 (30), a positioning ring (40), an elastic ring (50), a washer (60), a pintle (70), and  
16 a collar (80).

17 The first sheet (10) has a first opening (13) defined at a center thereof.  
18 The first opening (13) has a cross section with two parallel linear sides (not  
19 numbered) and two arcuate sides (not numbered) respectively between the  
20 parallel linear sides. Two first wings (11) are formed at two diametrically  
21 opposite sides of the first opening (13), and each have at least one (two in this  
22 embodiment) first hole (110) defined therethrough. Two first lugs (12) are  
23 formed on an upper surface of the first sheet (10) and respectively adjacent to the  
24 first wings (11).

1           The rotating ring (20) is mounted on the first sheet (10) and has a second  
2 opening (21) aligned with the first opening (13). An ear (22) is formed at an  
3 outer circumference of the rotating ring (20).

4           The second sheet (30) is mounted on the rotating ring (20) and has a  
5 third opening (33) defined therethrough and aligned with the first and second  
6 openings (13, 21). Four slots (34) are radially and evenly defined around an outer  
7 circumference of the third opening (33) and in communication with the third  
8 opening (33), e.g. each two adjacent slots (34) with an included angle of 90  
9 degrees, and each two opposed slots (34) with an included angle of 180 degrees.  
10 In this embodiment, the four slots (34) are respectively located at upper-left,  
11 lower-left, upper-right and lower-right positions of the second sheet (30). Two  
12 second wings (31) are formed at two diametrically opposite sides of the second  
13 opening (33), and each have at least one (two in this embodiment) second hole  
14 (310) defined therethrough. Two second lugs (32) are formed at a lower surface  
15 of the second sheet (31).

16           The positioning ring (40) is mounted on the second sheet (31) and has a  
17 fourth opening (42) defined therethrough and aligned with the third opening (33).  
18 The fourth opening (42) has a cross section with two parallel linear sides and two  
19 arcuate sides between the linear sides and corresponding to the first opening (13).  
20 At least one protrusion (41) is formed at a lower surface of the positioning ring  
21 (40) and selectively positioned in one of the slots (34). In this embodiment, two  
22 protrusions (41) are provided at two diametrically opposite sides of the fourth  
23 opening (42).

24           The elastic ring (50) is provided on the positioning ring (40), and the

1 washer (60) is mounted on the elastic ring (50).

2 The pintle (70) has a cross section corresponding to the first opening (13)  
3 and the fourth opening (42), and in turn extends through the first opening (13) of  
4 the first sheet (10), the second opening (21) of the positioning ring (20), the third  
5 opening (33) of the second sheet (30), the fourth opening (42) of the positioning  
6 ring (40), the elastic ring (50), and the washer (60). The pintle (70) further has an  
7 annular recess (71) defined at a distal end thereof.

8 The C-like collar (80) is attached in the annular recess (71) to fasten the  
9 pintle (70) in the elements described above.

10 With reference to Fig. 4A, the ear (22) of the rotating ring (20) is at the  
11 right side in the figure, the right second lug (32) is beneath the ear (22), and the  
12 protrusions (41) are respectively located in two corresponding slots (34) (the  
13 upper-left and lower-right). In this situation, when the second sheet (30) is turned  
14 counterclockwise, the rotating ring (20) is pushed by the right second lug (32) to  
15 turn counterclockwise along with the second sheet (30). (When the second sheet  
16 (30) is turned clockwise, the rotating ring (20) will not be pushed by the second  
17 lug (32) and will not be rotated, so this status will not be shown or described in  
18 detail).

19 With reference to Fig. 4B, when the second sheet (30) is rotated 90  
20 degrees from an original position, the protrusions (41) are respectively located in  
21 the other slots (34) (the lower-left and the upper-right) to position the second  
22 sheet (30).

23 With reference to Fig. 4C, when the second sheet (30) is rotated 180  
24 degrees from an original position, the ear (22) of the rotating ring (20) is at the

1 left side in the figure, and is blocked by the left first lug (12), so the second sheet  
2 (30) cannot be rotated further counterclockwise. At the same time, the  
3 protrusions (41) are located in the corresponding slots (34) (the upper-right and  
4 lower-left) to position the second sheet (30).

5 With reference to Fig. 5A, the ear (22) of the rotating ring (20) is at the  
6 left side in the figure, the left second lug (32) is beneath the ear (22), and the  
7 protrusions (41) are respectively located in two corresponding slots (34) (the  
8 upper-left and lower-right). In this situation, when the second sheet (30) is turned  
9 clockwise, the rotating ring (20) is pushed by the left second lug (32) to turn  
10 clockwise along with the second sheet (30). (When the second sheet (30) is  
11 turned counterclockwise, the rotating ring (20) will not be pushed by the second  
12 lug (32) and will not be rotated, so this status will not be shown or described in  
13 detail).

14 With reference to Fig. 5B, when the second sheet (30) is rotated 90  
15 degrees, the protrusions (41) are respectively located in the other slots (34) (the  
16 lower-left and the upper-right) to position the second sheet (30).

17 With reference to Fig. 5C, when the second sheet (30) is rotated 180  
18 degrees, the ear (22) of the rotating ring (20) is at the right side in the figure, and  
19 is blocked by the right first lug (12), so the second sheet (30) cannot be rotated  
20 further clockwise. At the same time, the protrusions (41) are located in the  
21 corresponding slots (34) (the upper-right and lower-left) to position the second  
22 sheet (30).

23 Therefore, according to the invention, the hinge can be rotated  
24 clockwise and counterclockwise and positioned at the angles of 0 degrees, 90

1    degrees, 180 degrees, -90 degrees, and -180 degrees.

2            It is to be understood, however, that even though numerous  
3    characteristics and advantages of the present invention have been set forth in the  
4    foregoing description, together with details of the structure and function of the  
5    invention, the disclosure is illustrative only, and changes may be made in detail,  
6    especially in matters of shape, size, and arrangement of parts within the  
7    principles of the invention to the full extent indicated by the broad general  
8    meaning of the terms in which the appended claims are expressed.